

Perception of Online Learning among STEM School Students: Prospects and Challenges

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***Abstract:** The concept of education has been changed radically in the last few years due to covid -19 pandemic. During COVID-19 pandemic the whole world faced a major transformation in the educational system to emergency virtual classes. However, this situation creates an opportunity to evaluate the efficacy of online learning from students' perspectives. This study aims at exploring the experiences of secondary level students during online learning. The paper intends to assess the challenges, opportunities and successes for online learning. To discover the challenges and opportunities for online learning, secondary level students from a STEM based school in Delhi was surveyed about their experiences of online classes. The sample was chosen using simple random sampling technique. The data was collected through a self-constructed tool. Data was analyzed using quantitative as well as qualitative techniques. The study reveals that despite various challenges like digital divide, poor ICT infrastructure, lack of interaction, time management, cyber safety related issues etc. The perception was positive towards online learning. However, the unequal distribution of digital technology and quality of education provided online is crucial. Findings suggests that there is scope for innovation in infrastructure and technology. Digital development should be focused. It also provides guidelines to the educationist and curriculum developer for designing flexible educational program and pedagogical reforms required for ensuring the good quality of online education. Online learning is now become an essential part of learning and a harmonic blending is required to ensure an effective, equitable and inclusive education for all.*

***Keywords:** Online learning, STEM School, ICT Infrastructure, digital divide, cyber safety and security.*

Introduction

“Education is the most powerful weapon which you can use to change the world”

-Nelson Mandela

Education is the most important determinant factor and an essential component for the growth and success of any individual and country. In 2019, the COVID-19 pandemic caused a major disruption to education around the world, resulting in the abrupt closure of colleges and universities all around the world. A UNESCO report states that "Covid-19 has affected 32 crore (320 million) students in India and over 1.72 billion learners worldwide due to the closure of schools and universities." Online learning quickly supplanted the traditional classroom approach, which is still the most common way of teaching in India. Even though online learning was already available before the pandemic, its extensive use during the lockdown signalled a significant change and successfully eliminated barriers to learning based on location. This shift

turned into one of the biggest unplanned worldwide online learning experiments. The secondary level of education plays a crucial role on how students' futures are shaped and organized.

The National Education Policy (NEP) 2020 vision was closely aligned with the pandemic's acceleration of online learning integration. A blended approach is encouraged by the NEP, which encourages the employment of virtual, online, and face-to-face approaches. It places a strong emphasis on adaptability, enabling pupils to participate in learning according to their unique circumstances. By removing geographical and temporal constraints, online learning has become an essential part of the changing educational environment.

Online Learning

Online learning, sometimes referred to as e-learning, online education, or virtual learning, is a kind of education that gives students access to instructional materials and resources via the internet and other digital means. This approach gives students access to classes, study materials, and peer and instructor connections through online platforms. Online learning asserts a transference type and suggests that students and teachers are physically separated (Wang et al., 2013, Wilde & Hsu, 2019). According to Keshavarz (2020), although traditional teaching practices are useful, they should also change to reflect the advancements in educational technology. Distant learning, blended learning, and e-learning are just a few of the terms scholars use to describe online education (Adarkwah, 2020).

The NEP 2020 emphasizes the importance of integrating digital education into the academic program and recognizes importance of online learning. NEP has given a separate place to online and digital education in chapter 24 of the document. The National Education Policy 2020 acknowledges both the possible risks and dangers associated with technology and the significance of utilizing its advantages. Conducting well-thought-out and suitably scaled pilot studies is necessary to ascertain how to capitalize on the advantages of digital and online learning while minimizing or resolving its drawbacks. NEP emphasizes the creation and expansion of virtual labs. The expansion of e-learning with the NEP-2020 resulted in the broadening of online education to remote areas and Divyang students by installing appropriate network connections there as well as removing the digital divide. Through programs like the Digital India campaign and the use of mass media for educational broadcasts, the policy seeks to close the digital divide.

Online Learning Resources

Online learning resources are accessible online and come in the forms of HTML documents, audio video courses, links to different educational websites, etc. Numerous online learning resources have also been introduced by the Ministry of Education (MOE) government of India, e.g. SWAYAM, SWAYAM PRABHA, NDL, e-Pathshala, PM e-VIDYA: One Nation One Digital Platform, ICT@ school, YouTube channel, Kishore Manch, NROER, DIKSHA and NISHTHA etc. Online learning resources are those that are available over the internet and go beyond printed materials. For instance, any HTML document that supports the children's learning and is relevant to their curriculum. any digital resource that supports student learning

and is made available in a variety of delivery modalities. Numerous choices available for online learning for young children in elementary, middle, and high schools. There are several online learning choices available for pupils in schools at all levels. The educational material is available in the formats like text, images, PDFs, QR Codes, E-Libraries, audio books, lectures on video, virtual labs, OLABS, virtual reality, augmented reality, etc. The educational materials are quick to obtain, simple to understand, and specifically created with the needs of students and other stakeholders in mind.

Following the pandemic, students' learning habits changed as a result of the resumption to regular classrooms. Nowadays, a lot of learners use a blended learning strategy that blends online and offline learning. Students are exposed to more digital threats as online learning grows, which emphasizes the necessity of vigilant parents. In addition to textbooks, the internet has emerged as a vital instructional tool.

STEM Schools

The School of Excellence (SOE) was established in 2018. The primary goal of the government was to turn these schools into specialized institutions. The Directorate of Education, Government of the National Capital Territory of Delhi, has established 'Schools of Specialized Excellence (SOSE)' to offer specialized learning opportunities to secondary school students (classes 9 through 12) who have a strong interest in and aptitude for a particular field. SOSE uses English as its instruction language. The Delhi government launched the Schools of Specialized Excellence (SOSE) program to provide students with access to top-notch faculty and facilities for cutting-edge curriculum and learning in specialized subjects.

Delhi is now home to 56 Dr. B. R. Ambedkar Schools of Specialized Excellence spread across 38 locations, 18 of which provide dual specializations. Of these 21 are for STEM, 17 for Humanities, 12 for High-End 21st Century Skills, 5 for Performing and Visual Arts, and 1 (Residential) for Armed Forces Preparation.

STEM education refers to science, technology, engineering, and mathematics education. It places a strong emphasis on the integration of these four disciplines to provide students with a relevant and well-rounded education that equips them for careers in numerous STEM fields. STEM schools usually offer particular programs and teaching strategies to promote real-world learning, problem-solving skills, and critical thinking.

Delhi Model Virtual School (DMVS)

Delhi Model Virtual School (DMVS) is the first full-time, regular virtual school of its kind. In an effort to reinvent education, the Delhi government founded DMVS as a "School of Specialized Excellence." It is connected to the Delhi Board of School Education (DBSE), and its qualifications are the same as those granted by any other board recognized in India or by the Central Board of Secondary Education (CBSE). It's an online school that runs full-time. It's not an open school; rather, it's a regular Delhi government school. This is promoted under the slogan "anywhere living, anytime learning, anytime testing." On the DMVS learning platform,

instructors and students interact through live classes, small-group tutorials, and one-on-one mentoring for both academic and personal assistance. All of this is offered flexibly, at the students' own speed, and without price. A range of career-focused skill-building programmes will be offered, along with complimentary help with preparing for competitive exams like JEE and NEET.

Review of related Literatures

Badiuzzaman & Mustaneer (2021) found in their study that many students lack reliable internet and devices, with studies showing that only 32.5% of students in Bangladesh could attend online classes seamlessly due to poor network infrastructure and high data costs. Aswathi & Haneefa (2015) investigated factors such as socio-economic background and digital literacy contribute to a usage divide, where students with access may still struggle to effectively utilize technology.

Kanvaria (2020) emphasized how the lockdown measures, which made individuals stay at home, stimulated the adoption of digital distance learning. They looked at the variables affecting teachers', students', and teacher educators' experiences teaching and learning. However, Kanvaria also addressed reservations regarding the standard of this type of teaching, indicating that there were questions regarding its efficacy.

Mishra et al. (2020) conducted a thorough investigation for the advantages and disadvantages of online learning during the crucial COVID-19 pandemic. They focused how a set of students found online instruction useful and engaging because they could review the lectures and videos that the lecturers had published. This report also identifies inconsistent internet access as one of the main issues, both students and teachers encounter. Also, there were additional problems like the daily online time limit of five hours and the amount of usable data. According to the studies, most students typically only had access to 1.5 to 2.0 GB of material before feeling helpless. They came to the conclusion that the pandemic had a negative impact on the educational sector.

Rahman (2020), looked into the online learning experiences of learners in Assam, India, during the pandemic. The study discovered that factors like poor internet access, high data plan costs, a lack of adequate technology, and teachers' lack of technological pedagogical expertise hamper the online teaching-learning process. Seema & Nangia (2020) found digital learning is a more supportive tool for students to learn in the limits of their comfort zone because it has no physical boundaries, offers more learning engagement opportunities than traditional learning, and is more affordable. However, due to the impersonal nature of remote learning, face-to-face communication is typically regarded as the ideal form of communication. As a result, digital learning has its own drawbacks and difficulties.

Li & Li, (2021) concluded that shift to online learning has hindered meaningful interactions, with teachers facing difficulties in maintaining engagement and support for students, particularly those from marginalized communities. Tang et al., (2024) found that online learning environments expose students to cyber threats, including privacy issues and online harassment, which can deter participation and affect mental well-being. Júnior, (2023), found

some students appreciate the flexibility of online learning, others express frustration over the lack of personal interaction and support, impacting their overall learning experience. Aswathi & Haneefa, (2015) concluded that there is a notable gap in students' ability to navigate various online learning platforms, influenced by prior exposure and training in digital tools.

In paragraph 8.11 of the National Education Policy 2020, it is emphasized how important it is to provide children and adolescents' rights and safety top priority. Cyberbullies can likely be even more vicious than their offline counterparts since, in addition to using words, they can also attack using a wide range of media, such as sounds, altered images, text, videos, slide displays, and polls. (Li, 2007, Sabella, 2008). Starting on October 6, 2021, the Indian Cyber Crime Coordination Centre (I4C) has proposed that "Cyber Jaagrookta (Awareness) Diwas" be observed on the first Wednesday of every month. Both, offensive and defensive responsibilities in cyber security are being addressed by AI.

Need and Rationale of the Study

This paper intends to analyze the challenges, opportunities and successes for online learning. With this study the researcher tries to explore and investigate the experiences of secondary level STEM school students during online learning and future prospects of online education.

Research Question

1. What are the various challenges of online learning?
2. What are the opportunities and future prospects for online education in future?

Objectives of the Study

1. To identify the digital divide experienced by STEM school students while online learning.
2. To assess the teacher-student interaction experienced by students in online classes.
3. To identify cyber safety concerns faced by students in online classes.
4. To study the perception of students towards online learning.
5. To assess students' competency for using various online learning tools and resources.

Methodology

The present study was an exploratory survey, aims at exploring the challenges, opportunities and successes of online learning.

Population

All students at secondary level (class 9th & 10th) of Dr. B. R. Ambedkar Schools of Specialized Excellence (STEM), Kalkaji, New Delhi.

Sample, Sample Size and Sampling Technique

The sample consisted of 108 students (39 girls & 69 boys) of class 9th & 10th of Dr. B. R. Ambedkar Schools of Specialized Excellence (STEM), Kalkaji, New Delhi. Based on the

nature of the population of the present study, simple random sampling was adopted by the researcher to form the sample of the study.

Tool for Data Collection

Tool used for data collection was self-prepared and validated from experts. A mixed questionnaire comprised of 39 questions was prepared. First 9 questions were related to demographics and remaining 30 questions evaluate the availability of infrastructure and digital devices, challenges in online learning, cyber safety concerns and future prospects of online education. Reliability coefficient (r) was 0.91 which was significant at 0.01 level.

Procedure

The researcher met with the principal of the school and explained about the purpose of the study. After seeking permission, the researcher approached the class teacher, and the tool was distributed in the class with the help of class teachers. After some time, the tool was collected from students.

Data Analysis and Interpretation

The data was analyzed using the quantitative as well as qualitative technique.

Delimitations of the Study

1. The study was delimited to the secondary level (class 9th & 10th) students of SOSE, South Delhi.
2. The study was conducted only in one STEM school of Delhi.

Results and Discussion

The findings of the study were discussed below:

Gender Ratio and Class

Gender ratio and class for the secondary students have been represented in the following table 1 and 2.

Table 1: Gender Ratio

Gender Ratio	Frequency	Percentage
Girls	39	36.1%
Boys	69	63.9%

Table 2: Class

Class	Frequency	Percentage
9	60	55.5%
10	48	44.5%

The gender distribution revealed an imbalance in the sample between both genders, with a greater percentage of boys (63.9%) than girls (36.1%). Class-wise, 44.5% of participants were from Class 10, while the majority (55.5%) were from Class 9.

Findings for Objective -1

Objective 1: To identify the digital divide experienced by STEM school students while online learning.

To study the digital divide among students the students' data was collected related to their annual family income, device availability and its access, availability of infrastructure and used technology like, high-speed internet, network issues and power supply. The outcomes have been presented in the following table 3.

Table 3: Annual Family Income of Students

Annual Family Income	Frequency	Percentage
Below 1 lakh	13	12.1%
1-5 lakh	52	48.1%
5-10 lakh	27	25%
Above 10 lakhs	7	6.5%
Can't say	9	8.3%

The above data reveals that the majority of students (48.1%) were from middle-class backgrounds, with family incomes ranging from 1 to 5 lakhs per year. Only 6.5% of homes were high-income, suggesting that there is little representation from affluent backgrounds, while over 25% of households are upper-middle-income (₹5–10 lakhs).

A lower percentage (12.1%) came from low-income households with yearly incomes under one lakh could encounter major obstacles while trying to access online learning, which could have an impact on their performance and motivation. Only 6.5% of respondents said they have family income more than 10 lakhs, indicating that high-income groups were underrepresented.

There was a significant difference in the economic level of students. Furthermore, 8.3% of students were either uncertain or unwilling to reveal their income, maybe as a result of privacy concerns.

These findings can be corroborated by Aswathi and Haneefa (2015) study that inequalities in technology usage are influenced not only by access but also by factors such as socio-economic background and digital literacy, which create a significant usage divide among students.

Overall, the data shows that students' economic backgrounds vary greatly, highlighting the necessity of inclusive and easily accessible online learning practices.

Device Access: The device access has been represented and discussed in the following Table 4.

Table 4: Device Access

Device Access	Frequency	Percentage
Yes, absolutely	54	50%
Yes, but doesn't work well	36	33.3%
No, I borrow from others	13	12.1%
Don't have any device	5	4.6%

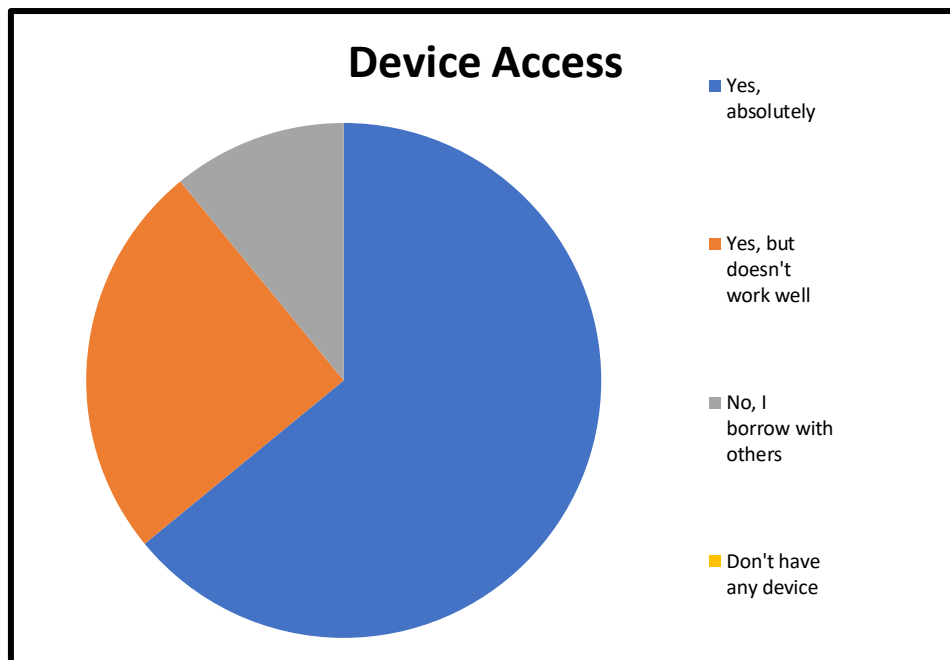


Fig. 1: Device Access

Students' capacity to participate fully in online learning was impacted by these disparities, which underscore serious digital inequality. The findings shows that there was poor and unequal distribution of devices. Few students have multiple device and few don't have any of them. Device use/used for Online Learning: Students reply for device used have been represented and discussed in the following Table 5.

Table 5: Device use/used for Online Learning

Device use/ used for Online Learning	Frequency	Percentage
Laptop	32	29.6%
Desktop	7	6.5%
Tablet	9	8.3%
Smartphone	97	89.8%
*Multiple selection was allowed		

Data reveals, 89.8% of students rely on smartphones, making them the most popular device for online study. The usage of desktop computers (6.5%), tablets (8.3%), and laptops (29.6%) is much lower.

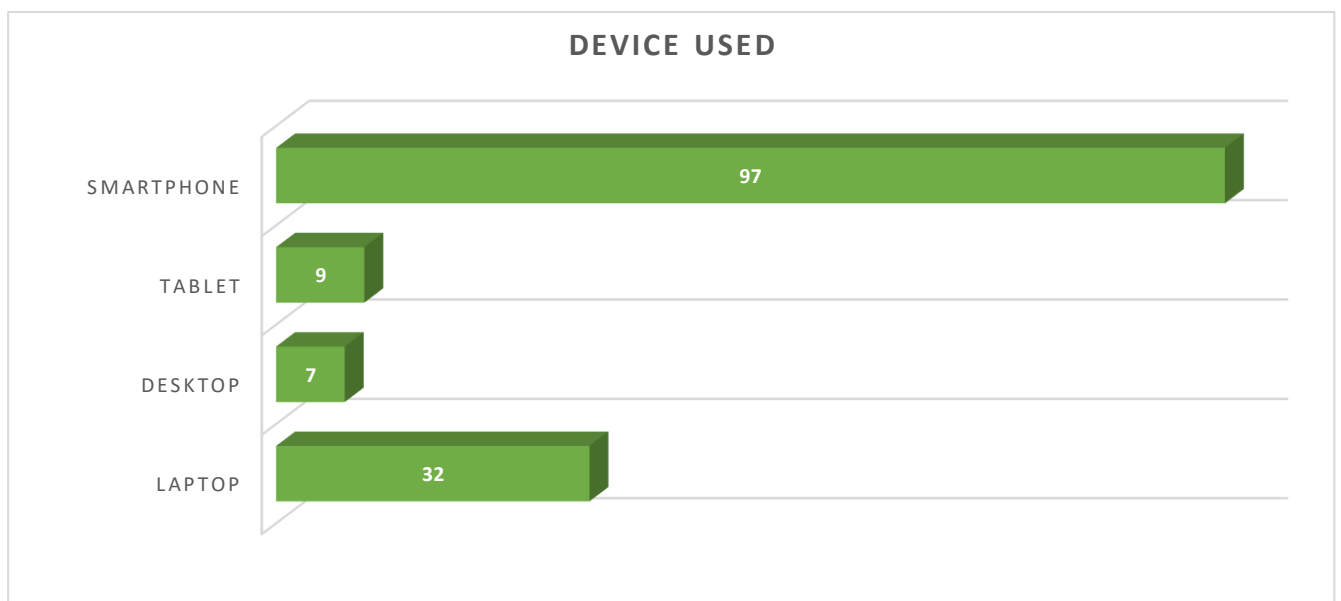


Fig. 2: Device use/used for Online Learning (Multiple selection)

This suggests that the majority of students rely on mobile devices, which could restrict functioning and lower the standard of their education as a whole. The trend also shows how accessibility and affordability affect device selection. The findings shows that there was poor and unequal distribution of devices. Few students have multiple device and few don't have any of them.

Infrastructure: Students view for Infrastructure available have been represented and discussed in the following Table 6.

Table 6: Infrastructure and Technology

Infrastructure and Technology	Yes		No	
	Frequency	Percentage	Frequency	Percentage
High speed internet at home	38	35.2%	70	64.8%
Network issue	77	71.3%	31	28.7%
Power cut	40	37%	68	63%

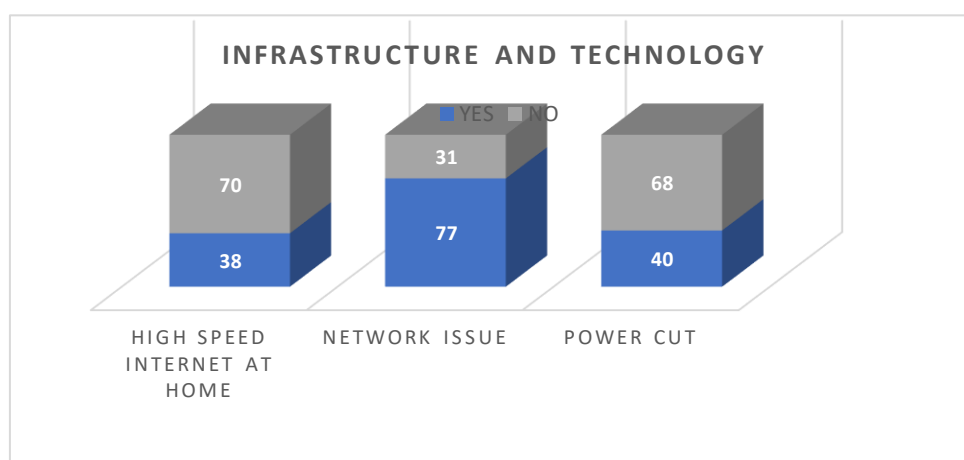


Fig. 3: Infrastructure and Technology

The data illustrates that students confront significant infrastructure issues. Just 35.2% of households have high-speed internet, and 71.3% say they frequently experience network problems. Furthermore, 37% of people have power cuts when learning. These restrictions seriously impair students' capacity to engage in online learning and fuel digital inequality.

These findings corroborated with the study of Rahman (2020). His research examined how students in Assam, India, experienced online learning during the pandemic. According to the study, the online teaching and learning process is hampered by issues including slow internet connectivity, expensive data plans, a lack of sufficient technology, and teachers' lack of technological pedagogical knowledge. Mishra et al. (2020) also revealed in his study numerous problems, though. Inconsistent internet connectivity is concern that both students and teachers faced during the critical COVID-19. This objective's findings show that there is a considerable digital gap, which is a major barrier to online education, due to the unequal and poor distribution of ICT and inadequate infrastructure. The results of this objective indicate that technology and infrastructure are amenable to innovation. Digital development should be strengthened as a means to guarantee the participation of the most underprivileged people in society.

Objective 2: To assess the teacher-student interaction experienced by students in online classes.

To study Teacher- Student Interaction in online class four statements were studied which were represented and discussed in table 7.

Table 7: Teacher - Student Interaction

Teacher- Student Interaction Statement	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Students ask questions to the teacher in online classes	74	68.5%	34	31.5%
One- one discussion while learning online	47	43.5%	61	56.5%
Personal guidance from teachers	70	64.8%	38	35.2%
Discussion forum in online classes	83	77%	25	23%

Moderate interaction in online classes is suggested by the data. Only 43.5% of students have individual discussions, despite the fact that 64.8% receive personal guidance and 68.5% of students ask questions, suggesting that there is little individualized assistance. However, 77% of respondents mentioned the existence of discussion forums, indicating that in the context of online learning, group interaction is more prevalent than one-on-one communication. Result of this objective can be corroborated with the study of Seema & Nangia (2020). The study found that while remote learning is impersonal, face-to-face communication is frequently recognized as the best type of communication. These observations corroborate the findings of Li and Li (2021), who emphasize that the transition to online learning has impeded meaningful teacher-student interactions and posed significant challenges in sustaining engagement and providing adequate support, especially for students from marginalized communities.

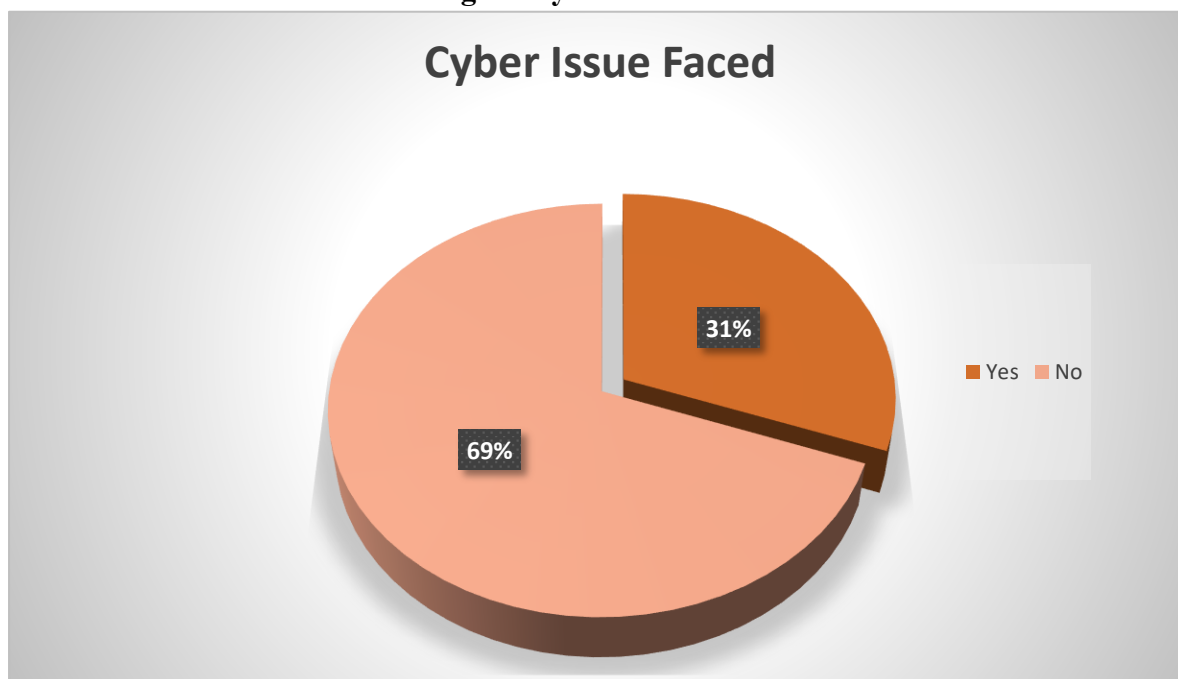
Findings of this objective reveal that there was less interaction between teacher and student. Thus, it can be interpreted that there is lack of personal attention from teacher's viewpoint towards their students which denotes lack of equal participation in the online class.

Findings suggest that the teacher should ascertain to focus and promote all students. Teacher should also ensure equal collaboration of students and try to keep students engaged in online class.

Objective 3: To identify cyber safety concerns faced by students in online classes.

Cyber issues faced by students in the form of any kind of mishappening or online bullying during online classes were represented below-

Fig. 4: Cyber Issue Faced



The findings reveal that thirty one percent students faced cyberbullying/cyber concerns in the form of some behaviour identified as cyber safety concerns while learning online. Those students reported some behaviours/mishappening/cybercrime regarding violation of their cyber safety, in online classes. The behaviours identified were enlisted in the below table.

Table 8: Behaviour identified as Cyber Concerns

Behaviour identified as Cyber Concerns	Frequency	Percentage
Students' Password hacked by unknown	3	2.8%
Unknown ID with suspicious name and account remove other students from online class	20	18.5%
Student missed his few classes due to his removal by unknown	16	14.8%
ID and password were hacked and hacker joined the class with student's name and start abusing in classroom	2	1.85%
Students from other class entered in the class with different ID and started writing abusive words	3	2.8%
Someone with unknown ID used offensive name in the online class	16	14.8%
Entry of unknown ID with suspicious name and account in online classes	27	25%
Person with fake account entered with off camera and starts making weird voices in the background or play song	9	8.3%
Unknown person shared their screen with irrelevant video, song or movie	8	6.2%

Several cyber-related disruptions in online classes were revealed by the data. Entry of unknown id with suspicious name and account in online classes was the most common problem (25%) followed by instances of students being removed by unauthorized users (18.5%) also unknown id used offensive name for other students in the online class reported by 14.8%. Inappropriate screen sharing, rude language, and password hacking were further issues. Even though some of the events were less frequent, they nevertheless show significant security flaws and the necessity of more robust digital safety measures to provide a secure and concentrated online learning environment.

The finding was consisted with the studies of Li (2007), Sabella (2008) that revealed cyberbullies can attack using a variety of media in addition to words, such as sounds, noise, altered photos, text, videos, slide screens, and polls, cyberbullies may be much more violent than their offline counterparts.

The findings reveal that the online classroom environment is at risk from the safety viewpoint. Teacher should try to monitor online classes carefully and restrict the entry to specific and limited users. Findings of this objective suggest that there is ample need of promoting awareness for cyber safety among students and teachers. Also, there is need of training for students and teachers for safe and responsible use of internet.

Objective 4: To study the perception of students towards online learning.

The findings for this objective have been presented in the table 9.

Table 9: Perception for Online Learning

Statement	Always	Sometimes	Never
I feel competent in using Various online learning resources	52 (48.2%)	27 (25%)	29 (27%)
I feel competent in using various conferencing tools (Google meet, Zoom) for online classes.	79 (73.1%)	23 (21.3%)	6 (5.6%)
I think technical training is important for online learning.	72 (66.7%)	27 (25%)	9 (8.3%)
Understanding science subject and experiment is very difficult in online classes	32 (29.6%)	38 (35.2%)	38 (35.2%)
I prefer to study online for some of the classes in future.	11 (10.2%)	34 (31.5%)	63 (58.3%)
I enjoyed online learning.	18 (16.7%)	27 (25%)	63 (58.3%)
I learn as much in online as in offline classes.	16 (14.8%)	22 (20.4%)	70 (64.8%)

The above table-7 depict perception of students for online learning. The data indicates that seventy-three percent students feel competent using conferencing tools such as Google Meet and Zoom, and about sixty-seven percent agree that technical training is essential for effective online learning. However, only forty eight percent feel confident using a variety of online learning resources, suggesting limited digital literacy beyond basic tools. A significant challenge was seen in science education, with nearly sixty five percent of students reporting that understanding scientific concepts and experiments online is difficult from always to sometimes. Furthermore, fifty-eight percent of students did not enjoy online learning, and nearly sixty-five percent believe they learn less in online settings compared to traditional classrooms. Only ten percent of students expressed a preference for online classes in the future, reflecting a clear inclination toward in-person learning experiences. These findings underscore the need for more engaging, interactive, and well-supported online education models, especially for complex subjects like science. The findings of this objective reveal the perception of students and opportunities of online education. Online education and online resources are convenient, widely available and easily accessible. Due to flexibility of time and location it is accessible and available widely.

These perspectives corroborate the findings of Júnior (2023), who reported mixed reactions to online learning while some students value its flexibility, others express dissatisfaction due to limited personal interaction and support, which negatively affects their overall learning experience.

On the contrary like everything has two aspect online learning also can never replace offline learning due to its various constraints. It can be interpreted that online education is very effective and students support and enjoy online classes to some extent.

Result suggests for implementing innovative pedagogical approach, which is required to assure quality education online.

Objective 5: To assess students' competency for using various online learning tools and resources.

Findings of these objectives revealed outcomes presented below in the table 10.

Table 10: Competency for using Online Learning Tools and Resources

Online Learning Tools and Resources	Always	Sometimes	Never
Text doc	11 (10.3%)	72 (66.6%)	25 (23.1%)
Pdf version of e-books	16 (14.8%)	49 (45.4%)	43 (39.8%)
E-library	0	2 (1.8%)	106 (98.2%)
Flipbooks	0	0	108 (100%)
QR code-based books	0	18 (16.6%)	90 (83.3%)
Online images	36 (33.3%)	61 (56.4%)	11 (10.3%)
Audio book	0	31 (28.7%)	77 (71.3%)
Video based lectures	45 (41.6%)	63 (58.3%)	0
YouTube video	54 (50%)	52 (48.2%)	2 (1.8%)
Virtual labs	0	70 (64.8%)	38 (35.2%)
Virtual Reality	0	27 (25%)	81 (75%)
Augmented Reality	0	0	108 (100%)

The above table 10 represent student's competency for using various online learning resources. YouTube videos and video-based lectures was most popular resources used by most of the students and almost 100% students used them. On the contrary e-library, flipbooks, QR code-based books, and augmented reality were least used resources and more than 80% students never used them. Afterwards virtual reality and audio books were never used by more than 70% of the students. Pdf version of e books, text doc, online images and virtual labs were used by more than 50% of the students.

The findings of this objective can be corroborated with the study of Mishra et al. (2020). They underlined how some students found online learning to be useful and interesting because they could go back and watch the lectures and videos that the lecturers had posted. To guarantee that online learning resources are accessible to teachers and students from all backgrounds, policies must be put in place.

This finding also corroborated the work of Aswathi and Haneefa (2015), who identified significant skill disparities among students in navigating online learning platforms, largely shaped by their previous exposure to and training in digital tools.

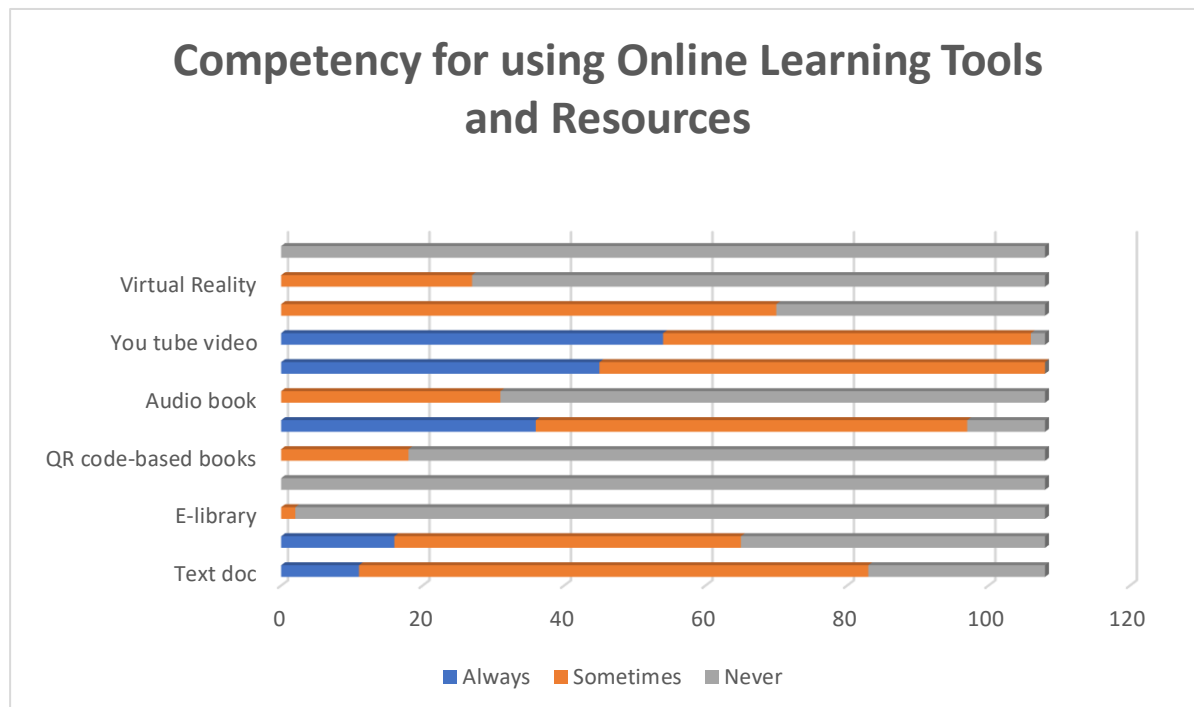


Fig. 5: Competency for using Online Learning Tools and Resources

Findings of this objective reveal that students use online resources to enhance their learning and understanding very efficiently and effectively according to their capability. It can arouse interest and the students can learn on their own. The difficulty level, ease and access are different for all resources. Few of them are easily available and easy to use and few of them requires advance technical skills Competency for using these resources varies a lot.

Findings suggests that teacher should try to motivate students to use online educational resources in effective way. The resources should be designed according to the capacity and need of the child. Thus, the students will make the best use of the available online educational resources.

Implication

The results of this study have important repercussions for authorities, developers of education programs, instructional designers, and educational professionals. The study draws attention to both the possibilities and challenges that come with online learning. According to the findings, there is an immediate requirement to improve technological infrastructure and digital platforms to make sure they are cutting edge, affordable, and able to bridge the current digital divide. Programs for flexible education must be created to meet the various needs of

all parties participating in online learning. The results also highlight how urgently cyber safety and security measures need to be strengthened. Raising awareness of cyber safety among children, educators, and parents is crucial, as is offering tailored guidance on how to use the internet responsibly. The study also suggests that curriculum designers rethink and modify teaching methods to better suit the needs of students, which will promote more successful online learning. The future of online education will ultimately be greatly influenced by these changes in digital infrastructure, pedagogy, and safeguarding procedures.

Conclusion

“Progress is impossible without change and those who cannot change their minds cannot change anything.”

- George

Bernard Shaw

Online education is becoming an indispensable component of contemporary educational systems, and the COVID-19 pandemic has shown its importance and efficacy on a global basis. Traditional teaching methods have undergone a significant change as a result of online learning. Even if traditional classroom instruction is still crucial, online learning has grown in recognition, especially in light of the digital age and how artificial intelligence is affecting many fields, including education. Online learning is expected to keep growing and changing based on the trajectory of educational growth. As a result, it is anticipated that traditional and digital learning modalities will dynamically and increasingly merge in the future of education.

“If we teach today as we taught yesterday, we rob our children of tomorrow.”

– John Dewey

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